

sor to the legacy version of RAMS — a computer program used to manage all work, nonconformance, corrective action, and configuration management on rocket engines and ground support equipment at Stennis Space Center. The legacy version resided in the FileMaker Pro software system and was constructed in modules that could act as standalone programs. There was little or no integration among modules. Because of limitations on file-management capabilities in FileMaker Pro, and because of difficulty of integration of FileMaker Pro with other software systems for exchange of data using such industry standards as SQL, the legacy version of RAMS proved to be limited, and working to circumvent its limitations too time-consuming. In contrast, SQL-RAMS is an integrated SQL-server-based program that supports all data-exchange software industry standards. Whereas in the legacy version, it was necessary to access individual modules to gain insight into a particular work-status document, SQL-RAMS provides access through a single-screen presentation of core modules. In addition, SQL-RAMS enables rapid and efficient filtering of displayed statuses by predefined categories and test numbers. SQL-RAMS is rich in functionality and encompasses significant improvements over the legacy system. It provides users the ability to perform many tasks, which in the past required administrator intervention. Additionally, many of the design limitations have been corrected, allowing for a robust application that is user centric.

*This program was written by Victor O. Alfaro and Nancy J. Casey of The Boeing Co. for Stennis Space Center.*

*Inquiries concerning rights for the commercial use of this invention should be addressed to the Intellectual Property Manager, Stennis Space Center, (228) 688-1929. Refer to SSC-00207.*

## **Distributing Data From Desktop to Hand-Held Computers**

A system of server and client software formats and redistributes data from commercially available desktop to commercially available hand-held computers via both wired and wireless networks. This software is an inexpensive means of enabling engineers and technicians to gain access to current sensor data while working in locations in which such data would otherwise be inaccessible. The sensor data are first gathered by a data-acquisition server computer, then transmitted via a wired network to a data-distribution computer that executes the server portion of the present software. Data in all sensor channels — both raw sensor outputs in millivolt units and results of conversion to engineering units — are made available for distribution. Selected subsets of the data are transmitted to each hand-held computer via the wired and then a wireless network. The selection of the subsets and the choice of the sequences and formats for displaying the data is made by means of a user interface generated by the client portion of the software. The data displayed on the screens of hand-held units can be updated at rates from 1 to somewhat more than 10 times per second.

*This program was written by Jason L. Elmore of Marshall Space Flight Center. For further information, contact Sammy Nabors, MSFC Commercialization Assistance Lead, at sammy.a.nabors@nasa.gov. MFS-32017-1*

## **Best-Fit Conic Approximation of Spacecraft Trajectory**

A computer program calculates a best conic fit of a given spacecraft trajectory. Spacecraft trajectories are often propagated as conics onboard. The conic-section parameters as a result of the best-conic-fit are uplinked to computers aboard the spacecraft for use in updating predictions of the spacecraft trajectory for operational purposes. In the initial application for which this program was written, there is a requirement to fit a single conic section (necessitated by onboard memory constraints) accurate within 200 microradians to a sequence of positions measured over a 4.7-hour interval. The present program supplants a prior one that could not cover the interval with fewer than four successive conic sections. The present program is based on formulating the best-fit conic problem as a parameter-optimization problem and solving the problem numerically, on the ground, by use of a modified steepest-descent algorithm. For the purpose of this algorithm, optimization is defined as minimization of the maximum directional propagation error across the fit interval. In the specific initial application, the program generates a single 4.7-hour conic, the directional propagation of which is accurate to within 34 microradians easily exceeding the mission constraints by a wide margin.

*This program was written by Gurkopal Singh of Caltech for NASA's Jet Propulsion Laboratory. Further information is contained in a TSP (see page 1).*

*This software is available for commercial licensing. Please contact Karina Edmonds of the California Institute of Technology at (818) 393-2827. Refer to NPO-40622.*